

### REMARKS

The Office asserts that the feature of the present claims “a silicon network bonded (i) via oxygen atoms to said oxides of said ceramic coating, (ii) via organic radicals to said polymeric nonwoven and (iii) via at least one carbon chain to a further silicon atom” is obvious over the disclosure of CA ‘062 (CA 2477062). The Office bases its assertion on two erroneous lines of reasoning.

#### The Rejections are Legally Defective

First, the Office erroneously asserts that the silicon network structure of the present claims is obvious because CA ‘062 suggests mixtures of certain adhesion promoters. The Office cites to the description of mixtures of adhesion promoters disclosed in the paragraph bridging pages 13 and 14 of CA ‘062 in support of this erroneous assertion. The Office appears to reason that CA ‘062 suggests the silicon network structure of the present claims because CA ‘062 describes a combination of adhesion promoters.

CA ‘062 describes a group of adhesion promoters that includes compounds that cannot possibly form the silicon network of the present claims. For example, the adhesion promoters of CA ‘062 include pure oxides such as  $\text{ZrO}_2$ ,  $\text{TiO}_2$  etc. Mixtures that contain only these materials cannot possibly form the silicon network of the present claims which requires silicon atoms bonded to both carbon atoms and oxygen atoms.

The Office concentrates its arguments on the group of adhesion promoters described on page 13, lines 20-21 of CA ‘062. This group of adhesion promoters includes octylsilane, fluorinated octylsilane, vinylsilane, amine-functionalized silane and/or glycidyl-functionalized silane. Applicants submit that it is readily evident that a mixture of, for example, fluorinated octylsilane and a vinylsilane cannot form the silicon network described in the present claims.

The conditions for forming one embodiment of the silicon network of the present claims are described on page 13 of the present application. At least two different means of forming the silicon network are described: (1) treating an adhesion promoter-containing oxide suspension with UV radiation (page 13, lines 6-15 of CA '062), and (2) using a combination of at least two adhesion promoters having alkyl radicals capable of entering into a chemical reaction with one another to form a covalent bond (page 13, lines 17-21 of CA '062).

With respect to the first means for forming the silicon network, Applicants submit that the Office's reasoning is factually incomplete and/or defective. The Office cites to CA '062 as evidence that it would be obvious to form the silicon network of the present claims by subjecting an adhesion promoter to irradiation. As support for the rejection the Office points out that CA '062 discloses the use of *infrared* radiation as a heating means. The Office appears to be of the opinion that the infrared radiation of CA '062 (see page 15, lines 25-27 of CA '062) is the same as the UV radiation described on page 13, lines 6-15 of the present application.

The Office's assertion in this regard is manifestly incorrect. UV radiation and infrared radiation are entirely different things. Especially in the chemical art, it is recognized that UV radiation can force chemical changes that are otherwise not possible with infrared radiation. For example, UV radiation causes photodegradation of plastics that otherwise does not occur with infrared radiation.

The difference between UV and infrared radiation is also evident to the layman. Infrared radiation warms the skin whereas UV radiation causes sunburn.

The Office's assertion that the cited art discloses or suggests the silicon network of the present claims because CA '062 discloses the use of infrared radiation is unsupported by the evidence of record and thus the rejection should be withdrawn.

With respect to the second means for forming the silicon network, the Office asserts that a combination of GLYMO with another of the adhesion promoters described at page 13, lines 6-15 of CA '062 inherently provides the silicon network structure of the present claims (see page 4, second full paragraph of the March 3 Office Action). Applicants submit that the Office's assertion in this respect is manifestly incorrect. There are many combinations of the adhesion promoters described in the paragraph bridging pages 13 and 14 of CA '062 that will not and can not form a covalent bond by the reaction of alkyl radical-containing adhesion promoters.

The adhesion promoters described on page 13, lines 20-21 do not all include a reactive alkyl group that can undergo reaction with an alkyl radical of another adhesion promoter molecule. For example, an octylsilane includes an octyl group bonded to a silicon atom. However, an octyl group is essentially unreactive to forming a covalent bond with other alkyl substituents. The fluorinated octylsilane is even further unreactive in this regard. Likewise, vinylsilanes adhesion promoters undergo reaction to form a covalent bond only under conditions that are essentially impossible when forming a sol and/or a coating composition.

It is a matter of fact that the allegedly obvious mixtures of CA '062 do not inherently form the silicon network of the present claims.

The rejection of the claims is therefore legally improper. The Office appears to erroneously assert that because CA '062 suggests mixtures of adhesion promoters the reference discloses an adhesion promoter mixture that inherently forms the silicon network of the present claims.

Applicants submit such reasoning is legally not supportable. At best, CA '062 *suggests* a mixture of the adhesion promoters described in the CA '062 reference. This suggestion is generic to the entire group of adhesion promoters described in the reference.

From such a suggestion it is legally improper to assert that the allegedly obvious mixture inherently meets the requirements of the present claims.

If the CA '062 reference expressly described or exemplified a mixture of GLYMO and AMEO then perhaps the Office would be in a position to shift the burden to Applicants to show that such GLYMO/AMEO mixtures do not inherently form the silicon network of the present claims. But this is not the case. Instead, CA '062 describes generic mixtures of adhesion promoters which, as shown above, do not inherently form the silicon network of the present claims.

Applicants thus submit that the Office's assertion of obviousness is not supportable in view of the facts of record.

#### Factual Evidence Probative of Non-Obviousness

The examples of the specification demonstrate the significantly improved adhesion that is obtained by using a combination of adhesion promoters and by subjecting a coating to UV radiation to form the silicon network of the claimed invention.

Inventive Examples 1 and 2 of the specification describe (1) a ceramic membrane having the silicon network of the claimed invention made by using a combination of adhesion promoters and (2) a ceramic membrane having the silicon network of the claimed invention made by subjecting a coating to UV irradiation, respectively. The ceramic material of the inventive examples exhibits:

- (1) "...remarkably good adhesion for the ceramic to the nonwoven. After 24 h immersion in water (at room temperature), no detachment of the ceramic was observed. The ceramic itself withstood a treatment with water at 120°C. in a pressure-stable reactor, i.e., is steam sterilizable. The bubble point after the 120°C. steam sterilization is an unchanged 1.7 bar approximately, and water flux is an unchanged 5800 l/m<sup>2</sup>hbar"; and

(2) "...remarkably good adhesion for the ceramic to the nonwoven. After 24 h immersion in water (at room temperature), no detachment of the ceramic was observed. The ceramic itself withstood a treatment with water at 120°C. in a pressure-stable reactor, i.e., is steam sterilizable. The bubble point after steam sterilization at 120°C remained an unchanged 3.5 bar approximately, and water flux was unchanged at 2100 l/m<sup>2</sup>hbar."

See for example paragraph [0089] of PG publication US 2008/0245735.

In contrast, the ceramic material of the Reference Example is made in a conventional manner with only a single adhesion promoter. The properties of this material are described as follows in the specification:

"...very poor adhesion for the ceramic to the nonwoven. After 24 h immersion in water (at room temperature), virtually the entire ceramic had become detached."

See for example paragraph [0087] of PG publication US 2008/0245735.

The as-filed disclosure thus provides a side-by-side comparison showing the effect of the claimed invention. The comparison is an objective comparison for which explicit testing parameters/conditions are described.

Applicants submit that the examples of the specification are probative of the non-obviousness of the claimed invention. The examples provide an objective comparison in terms of properties such as immersion in water proving that the ceramic materials of the claimed invention are substantially superior to conventional materials which contain only a single adhesion promoter or are treated only with heating instead of UV irradiation.

Applicants request withdrawal of the rejection and the allowance of all now-pending claims.

Applicants thank Examiner Fortuna for the helpful and courteous discussion of April 9, 2010. During the discussion Applicants' U.S. representative pointed out that an assertion that a suggested mixture necessarily suggests the feature of the present claims is legally not supportable.

Respectfully submitted,

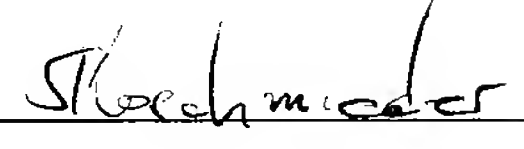
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